भारतीय मानक

Indian Standard

IS 3566 : 2023

वस्त्रादि — विस्कोस रेयॉन कट स्टेपल (स्पन) धागे — विशिष्टि

(दूसरा पुनरीक्षण)

Textiles — Viscose Rayon Cut Staple (Spun) Yarn — Specification

(Second Revision)

ICS 59.080.20

भारतीय मानक ब्यूरो
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November 2023 **Price Group 7**

Man-made Fibres, Cotton and their Products Sectional Committee, TXD 31

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Man-Made Fibres, Cotton and Their Products Sectional Committee had been approved by the Textile Division Council.

Viscose cut staple spun yarn is a type of yarn manufactured from ring spinning and vortex/Airjet spinning of viscose staple fibres. Viscose spun yarn is used in the weaving of fabrics used for suitings, inner linings for fur coats etc. It also has a wide application in apparels like saris, lingerie, ties, blouses etc.

This standard was first published in 1966. It was revised in the year 2022. It is being revised again to incorporate the following changes:

a) The scope has been modified;
b) The requirements of ring spun yarns have been modified to align it with latest industry practices;
c) The requirements for the air vortex/airjet yarns have been incorporated in the standard; and
d) The requirements for multifold yarn have been modified.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — VISCOSE RAYON CUT STAPLE (SPUN) YARN — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard specifies the requirements of 100 percent viscose cut staple ring spun and vortex/airjet spun yarn.

1.2 This standard does not cover the requirements for fancy yarns such as slub yarn, thick thin yarn, bicomponent yarns etc.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TERMINOLOGY

3.1 Lea — A continuous length of yarn measuring 120 yd in the form of a coil having 80 wraps wound on reel of 1.5 yd girth.

3.2 Lea Breaking Load — The breaking load of a lea determined on a pendulum type testing machine, the rate of traverse being 300 mm ± 15 mm per minute.

3.3 Single Yarn Tenacity — Tensile strength of a single strand at rupture expressed as force per linear density of the un strained specimen expressed usually as cN/tex (gf/tex).

3.4 Vortex/Airjet Spinning — Vortex/Airjet spinning is a type of open-end spinning, which is a method used to produce yarn from staple fibres. In this spinning process, the staple fibres are subjected to high-speed air currents within a spinning rotor. In this system, drafted fibres are introduced into a spindle by high-speed airflow to insert twist into the yarn. Fibres formed by these air flows possess a unique structure, and this provides the yarn with a wide range of functionalities.

3.5 Ring Spun Yarn — Ring spun yarn is a high-quality yarn produced through traditional spinning. Fibers are carded, drawn, and twisted in a ring spinning machine. The process imparts strength, durability, and softness to the yarn, with a smooth surface. It is widely used in textiles for fabrics, apparel, and home textiles due to its evenness, comfort, and moisture absorption properties.

4 GENERAL REQUIREMENTS

The yarn shall be manufactured from viscose staple fibre conforming to IS 17266. The yarn shall be clean and shall be reasonably free from visible defects which affect its appearance and weavability (*see* Annex B). All broken ends shall be properly pieced. There shall be no loose ends in hanks, cones or cheeses.

5 SPECIFIC REQUIREMENTS

5.1 Viscose Vortex/Airjet Yarn

The viscose single vortex/Airjet yarn shall comply with the requirements specified in Table 1.

Table 1 Requirements of 100 Percent Viscose Vortex/Airjet Yarn

(*Clause* 5.1)

Sl No.	Characteristics	Count of Yarn, Tex (Ne)				Method of Test, Ref to
		> 29.5 tex (< 20s)	> 19.6 to 29.5 tex (20s - < 30s)	> 14.7 to 19.6 tex (30s - < 40s)	≤ 14.7 tex (≥ 40s)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Count, Ne	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	IS 1315
ii)	Count CV, percent, *Max*	2.2	2.2	2.2	2.2	IS 1315
iii)	CSP, *Min*	2 048	1 995	1 959	1 931	IS 1671
iv)	Lea breaking load CV, Percent, *Max*	5.2	5.2	5.5	5.7	IS 1671
v)	Yarn tenacity, cN/tex, *Min*	13.7	13.3	13.1	12.9	IS 1670
vi)	Yarn tenacity CV, percent, *Max*	8.3	9.7	10.9	11.9	IS 1670
vii)	Breaking elongation, percent, *Min*	12.0	10.0	8.0	7.0	IS 1670
viii)	Unevenness, percent, *Max*	10.2	11.3	12.1	12.9	IS 16576
ix)	Unevenness CV, percent, *Max*	11.8	13.7	15.2	16.1	IS 16576
x)	Hairiness index, *Max*	5.2	4.5	4	3.8	Annex C
xi)	Imperfections/km, *Max*					IS 16576
	Thin (- 50 %)	6	17	35	61	
	Thick (+ 50 %)	20	44	76	116	
	Neps (+ 200 %)	23	40	59	80	
	Total	49	101	170	257	

NOTE — The requirement for hairiness index shall be applicable for doubled yarns also.

5.2 Viscose Ring Spun Yarn

The viscose single ring spun yarn shall comply with the requirements specified in Table 2.

Table 2 Requirements of 100 Percent Viscose Ring Spun Yarn

(*Clause* 5.2)

Sl No.	Characteristics	Count of Yarn, Tex (Ne)				Method of Test, Ref to
		> 29.5 tex (< 20s)	> 19.6 – 29.5 tex (20s - < 30s)	> 14.7 – 19.6 tex (30s - < 40s)	≤ 14.7 tex (≥ 40s)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Count, Ne	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	As declared with a tolerance of ± 3.0 percent	IS 1315
ii)	Count CV, percent, *Max*	2.2	2.2	2.2	2.2	IS 1315
iii)	Twist per metre, average	As declared with a tolerance of ± 10.0 percent	As declared with a tolerance of ± 10.0 percent	As declared with a tolerance of ± 10.0 percent	As declared with a tolerance of ± 10.0 percent	IS 832 (Part 1) or IS 832 (Part 2)
iv)	CSP, *Min*	2 220	2 220	2 205	2 205	IS 1 671
v)	Lea breaking load CV, Percent, *Max*	4.5	4.5	4.5	4.5	IS 1671
vi)	Yarn tenacity, cN/tex, *Min*	14.8	14.8	14.7	14.7	IS 1670
vii)	Yarn tenacity CV, percent, *Max*	8.6	9.6	10.4	11.7	IS 1670
viii)	Breaking elongation, percent, *Min*	13.5	12.6	12.1	11.3	IS 1670
ix)	Unevenness, percent, *Max*	9.10	10.20	10.70	11.20	IS 16576
x)	Unevenness CV, percent, *Max*	12.4	13.6	14.5	16.0	IS 16576
xi)	Hairiness index, *Max*	7.8	6.5	5.7	4.7	Annex C
xii)	Imperfections/km, *Max*					IS 16576
	Thin (- 50 %)	4	12	27	81	
	Thick (+ 50 %)	21	45	77	161	
	Neps (+ 200 %)	57	93	132	217	
	Total	82	150	236	459	

NOTE — The requirement for hairiness index shall be applicable for doubled yarns also.

5.3 Multifold Yarns

The single yarn used for producing multifold yarn shall satisfy the requirements specified in **5.1** and **5.2**.

5.3.2 The average resultant count of the multifold yarn shall be as agreed to between the buyer and the seller. However, a tolerance of ± 3 percent shall be permissible on the average resultant count. The resultant count shall be determined as per the method prescribed in IS 1315.

5.3.3 The lea breaking strength of multifold yarn shall be tested as per IS 1671 and CV percentage shall not be more than 4 percent. The count strength product of multifold yarn shall be not less than the value calculated from the following formula:

$$\text{CSP of multifold yarn} = \text{CSP of corresponding single yarn} \times (1.08)^{n-1}$$

5.3.4 The ply twist in the multifold yarn shall be as agreed to between the buyer and the seller, and the average ply twist shall be within ± 5 percent of the specified value. The twist in multifold yarn shall be determined by the method prescribed in IS 832 (Part 1).

5.3.5 The requirement for unevenness, yarn imperfections faults and yarn tenacity shall not be applicable to multifold yarns.

5.3.6 The requirement for hairiness index as specified in Sl No. (x) of Table 1 and Sl No. (xi) of Table 2 shall be applicable for vortex/airjet multifold yarn and ring multifold yarn respectively. The hairiness shall be tested as per the method prescribed in Annex C.

6 PACKING

The spun yarn shall be wound over paper/plastic cones/bobbins/cheeses in any mass as agreed between the buyer and the seller. All packages shall be packed in pallets or cartons or laminated high density polyethylene/polypropylene bags, or any other packaging as agreed between the buyer and the seller. Packing materials shall be roadworthy/ airworthy/seaworthy as agreed to between the buyer and the seller.

7 MARKING

7.1 Each carton/pallet of yarn shall be legibly marked with the following information:

a) Name and description of the material;
b) Manufacturer's name, address and trademark (if any);
c) Count of yarn;
d) Gross weight and net weight;
e) Lot/Batch/Merge number;
f) Indication of the source of manufacture; and
g) Any other information required by the buyer or by the law in force.

7.1.1 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

8 SAMPLING

8.1 The lot shall consist of all the cartons/pallets of yarn of same count and quality delivered to a buyer against one dispatch note.

8.2 Unless otherwise specified in the contract or order, the sampling plan as given in Table 3 may be used for inspecting and testing of yarn against this standard. The number of packages to be selected from the lot for general requirements shall be as per col (3) of Table 3.

8.3 The number of test specimens to be selected for other tests shall be in accordance with col (5) of Table 3. From each carton/pallet, five bundles or packages shall be selected at random. From each bundle or package, only one test specimen shall be selected (discarding at least the first 50 m from the package) for each of the requirements mentioned in 5. To ensure the randomness of selection, IS 4905 may be followed.

8.4 Criteria for Conformity

The lot shall be declared conforming to the requirements of this standard if the total number of defective samples/sub-samples does not exceed the permissible numbers given in col (4) or col (6) of Table 3 for general requirements and specific requirements respectively.

Table 3 Sampling Plan for Viscose Rayon Cut Staple (Spun) Yarn

(*Clauses* 8.2, 8.3 *and* 8.4)

Sl No.	Lot Size	Sample Size	Permissible No. of Defectives Samples	Sub-Sample Size (to be Drawn from Sample)	Permissible No. of Defectives Sub-Samples
(1)	(2)	(3)	(4)	(5)	(6)
i)	2 to 25	3	0	3	0
ii)	26 to 90	13	1	3	0
iii)	91 to 150	20	2	13	1
iv)	151 to 280	32	3	13	1
v)	281 to 500	50	5	20	1
vi)	501 to 1 200	80	7	32	2
vii)	1 201 and above	125	10	50	3

NOTE — If sample size equals or exceeds lot size, carry out 100 percent inspection

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 293 : 1980	Code for seaworthy packaging of cotton yarn and cloth (*third revision*)
IS 832	Textiles — Determination of twist in yarns:
Part 1 : 2021/ ISO 2061 : 2015	Direct counting method (*third revision*)
Part 2 : 2011/ ISO 17202 : 2002	Untwist/retwist method for single spun yarns (*second revision*)
IS 1315 : 1977	Method for determination of linear density of yarns spun on cotton system (*first revision*)
IS 1347 : 1972	Specification for inland packaging of cotton cloth and yarn (*first revision*)
IS 1670 : 1991	Textiles — Yarn — Determination of breaking load and elongation at break of single strand (*second revision*)
IS 1671 : 1977	Method for determination of yarn strength parameters of yarns spun on cotton system (*first revision*)
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 16576 : 2022	Textiles — Unevenness of textile strands — Capacitance method (*first revision*)

ANNEX B

(*Table* 1 *and Table* 2)

COMMON DEFECTS OF YARN ON CONES AND HANKS

B-1 COMMON DEFECTS OF YARN ON CONES

a) Stitches of more than 2.5 cm in length at the base;

b) Excessive stitches at the nose;

c) Soft cones;

d) Hard cones;

e) Collapsed cones;

f) Prominent stains inclusive of chalk and other markings;

g) Cut threads;

h) Absence of tail-end where it is required the length of the tail-end should not be less than 30 cm;

j) Ribbon formation;

k) Drum cuts;

m) Shade variation; and

n) Count mix up.

B-2 COMMON DEFECTS OF YARN ON HANKS

a) Improper leasing;

b) Nose and tail-end not tied with tie yarn;

c) Entanglement;

d) Presence of many knots with long tail-ends;

e) Presence of hard waste;

f) Excessive presence of twistlessness, irregular twist or cork screw effects in case of plied yarns; and

g) Plying of wrong counts.

ANNEX C

(*Clause* 4)

DETERMINATION OF HAIRINESS INDEX

C-1 HAIRINESS INDEX

In the Hairiness measurement unit, the hairiness of 1 cm yarn length is considered. A hairiness index is defined as total length of the protruding fibres with reference to the sensing length of 1 cm. H is a ratio of two lengths (of hairs and yarn), it is therefore a non-dimensional quantity.

C-2 MEASURING PRINCIPLE AND PROCEDURE

In the Hairiness tester, measuring field is formed by a homogeneous field of parallel light (infra-red rays). If yarn lies in this measuring field, only those rays that have been scattered by the fibres protruding from the main body of the yarn reach the detector. This scattered light results from the refraction, the diffraction, and the reflection at each of the separate fibres that is, the protruding fibres seems to become luminous. This scattered light is the measure of the hairiness and can be measured electrically. The detector transforms the light received into a proportional electrical signal.

During measurement the yarn traverse at a speed of 400 m/min for time duration of 1 minute in the measuring field. The measurement is undertaken by the instrument fully automatically based on minimum 10 observations per test.

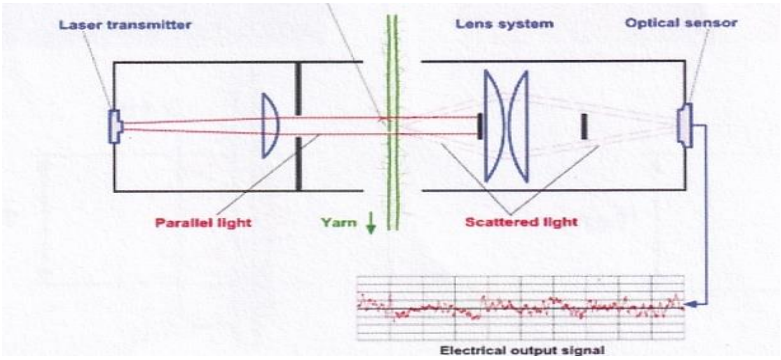

FIG. 1 HAIRINESS TESTING PRINCIPLE

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Man-made Fibres, Cotton and their Products Sectional Committee, TXD 31

Organization	*Representative(s)*
Textiles Committee, Mumbai	SHRI KARTIKAY DHANDA (***Chairperson***)
Association of Synthetic Fibre Industries, New Delhi	SHRI M. S. VERMA
AYM Syntex, Dadra & Nagar Haveli	SHRI ARNAB SAMANTHA
Confederation of Indian Textile Industry, New Delhi	SHRIMATI CHANDRIMA CHATTERJEE SHRI ANMOL GUPTA (*Alternate*)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Cotton Association of India, Mumbai	SHRI ATUL S. GANATRA SHRI VINAY N. KOTAK (*Alternate*)
Defence Material and Stores Research & Development Establishment, Kanpur	SHRI ASHOK KUMAR YADAV SHRI BISWA RANJAN DAS (*Alternate*)
Federation of Gujarat Weaver Welfare Association, Surat	SHRI ASHOK JIRAWALA SHRI SANJAY DESAI (*Alternate*)
GBTL Limited, Bhiwani	SHRI VIKAS AGGARWAL SHRI AMREEK SINGH (*Alternate*)
Grasim Industries Limited, Vadodara	SHRIMATI SHAILLEY GARG SHRIMATI ASHMITA PANCHAL (*Alternate*)
Gimatex Industries Pvt Ltd, Nagpur	SHRI ATUL KUMAR JAIN
ICAR – Central Institute for Research on Cotton Technology, Mumbai	DR SENTHIL KUMAR DR A. ARPUTHARAJ (*Alternate*)
JCT Limited, Phagwara	SHRI KHUSHWINDER SINGH DHILLON SHRI ARWINDER SINGH (*Alternate*)
North India Textile Mills' Association, Chandigarh	SHRI SANJAY GARG SHRI SIDHARTHA KHANNA (*Alternate*)
Northern India Textile Research Association, Ghaziabad	SHRI SANJEEV SHUKLA
Office of the Textile Commissioner, Mumbai	SHRI SOURABH KULKARNI SHRI PRANAV PARASHAR (*Alternate*)
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South Gujarat Warp Knitters Association, Surat	SHRI BRIJESH GONDALIYA SHRI RAMAN MEGOTIA (*Alternate*)
South Gujarat Texturisers Welfare Association, Surat	SHRI MURARI SHARAF SHRI SUMIT AGRAWAL (*Alternate*)
Textiles Committee, Mumbai	SHRI J. D. BARMAN SHRI P. N. S. SIVAKUMAR (*Alternate*)

Organization	*Representative(s)*
The Bombay Textile Research Association, Mumbai	SHRI R. A. SHAIKH SHRIMATI PRAGATI KULKARNI (*Alternate*)
The Cotton Corporation of India Ltd., Navi Mumbai	SHRI S. K. PANIGRAHI SHRI PRANJAL P JOSHI (*Alternate*)
The Cotton Textile Export Promotion Council, Mumbai	SHRI SIDDARTHA RAJGOPAL
The Southern India Mills' Association, Coimbatore	DR K. SELVARAJU SHRI NAGARAJAN ESAKKIMUTHU (*Alternate*)
The Synthetic & Rayon Textile Export Promotion Council, Mumbai	SHRI S. K. KHANDELIA SHRI PRAVEEN KUMAR S. SADH (*Alternate*)
The Synthetic and Art Silk Mills Research Association, Mumbai	DR MANISHA MATHUR SHRIMATI ASHWINI A. SUDAM (*Alternate*)
Veermata Jijabai Technological Institute, Mumbai	DR SURANJANA GANGOPAHYAY SHRI S. P. BORKAR (*Alternate*)
BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

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